UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

ECOLOGICAL SITE DESCRIPTION

ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

Site ID: R036XB120 NM

Site Name: Swale

Precipitation or Climate Zone: 10-16"

Phase:

PHYSIOGRAPHIC FEATURES

Narrative:

The topography of this site is level to moderately sloping and usually occurs in a slightly depressed position, which receives runoff from adjacent sites. Slopes range to 10 percent but average less than 5 percent. Elevations range from about 6,000 to just over 7,000 feet.

Land Form:

1. Depression
2. Swale
3.

Aspect:

1. Not significant except on the forb distribution
2.
3.

	Minimum	Maximum
Elevation (feet)	6000	7000
Slope (percent)	0	10
Water Table Depth (inches)	--	--

Flooding:	Minimum	Maximum
Frequency	occasional	frequent
Duration	none	Very brief

Ponding:	Minimum	Maximum
Depth (inches)	--	--
Frequency	--	--
Duration	--	--

Runoff Class:

Negligible to medium

Hydrologic unit D

CLIMATIC FEATURES

Narrative:

Average annual precipitation varies from about 10 inches to just over 16 inches. Fluctuations ranging from about 5 inches to 25 inches are not uncommon. The overall climate is characterized by cold dry winters in which winter moisture is less than summer. As much as half or more of the annual precipitation can be expected to come during the period of July through September. Thus, fall conditions are often more favorable for good growth of cool-season perennial grasses, shrubs, and forbs than are those of spring.

The average frost-free season is about 120 days and extends from approximately mid-May to early or mid-September. Average annual air temperatures are 50 degrees F or lower and summer maximums rarely exceed 100 degrees F. Winter minimums typically approach or go below zero. Monthly mean temperatures exceed 70 degrees F for the period of July and August.

Rainfall patterns generally favor warm-season perennial vegetation, while the temperature regime tends to favor cool-season vegetation. This creates a somewhat complex community of plants on a given range site which is quite susceptible to disturbance and is at or near its productive potential only when both the natural warm- and cool-season dominants are present.

	Minimum	Maximum
Frost-free period (days):	51	171
Freeze-free period (days):	130	252
Mean annual precipitation (inches):	10	16

Monthly moisture (inches) and temperature (^{0}F) distribution:

	Precip. Min.	Precip. Max.	Temp. Min.	Temp. Max.
January	.40	.91	12.9	47.0
February	.43	.65	16.6	51.2
March	.47	1.10	20.9	57.1
April	.30	.49	26.1	65.3
May	.46	.98	33.4	74.2
June	.51	.57	41.4	84.2
July	2.15	3.45	50.4	85.1
August	2.28	3.03	48.7	82.4
September	1.29	1.68	41.4	77.9
October	.81	1.12	29.4	69.2
November	.38	.71	19.1	57.3
December	.53	.95	13.1	48.9

Climate Stations:

					Period		
Station ID	290640	Location	Augustine 2E	From:	05/01/26	To:	07/31/00
Station ID	296812	Location	Pietown 19NE	From:	09/01/88	To:	07/31/00
Station ID	297180	Location	Quemado	From:	08/01/15	To:	07/31/00

Period

INFLUENCING WATER FEATURES

Narrative:

This site is not influenced by water from a wetland or stream.

Wetland description:

System	Subsystem	Class
N/A		

If Riverine Wetland System enter Rosgen Stream Type:

N/A

REPRESENTATIVE SOIL FEATURES

Narrative:

Soils are typically moderately fine- to fine-textured on the surface (or very thin surface loams, sandy loams or sandy clay loams, over fine-textured subsoils), moderately deep to deep with moderately fine- to fine-textured subsoils. Permeability is usually slow, and the available water capacity is moderately high to high. Soil cracking following dry periods provides an opportunity for occasional deep wetting when moisture is received, although runoff in the absence of good vegetative cover can be excessive. Erosion hazard is high.

Characteristic soils are: Moriarty silty clay loam, Manzano loam, Shanta silt loam.

Parent Material Kind: Eolian deposits
Parent Material Origin: Sandstone- shale

Surface Texture:

1. clay
2. sandy clay loam
3. silty clay loam, clay loam

Surface Texture Modifier:

1.
2.
3.

Subsurface Texture Group: Moderately fine to fine
Surface Fragments <=3" (% Volume): --
Surface Fragments >3" (% Volume): --
Subsurface Fragments <=3" (%Volume): 2-13
Subsurface Fragments >=3" (%Volume): --

	Minimum	Maximum
Drainage Class:	well	
Permeability Class:	impermeable	Moderately slow
Depth (inches):	0	72
Electrical Conductivity (mmhos/cm):	0.00	8.00
Sodium Absorption Ratio:	0.00	12.00
Soil Reaction (1:1 Water):	6.6	9.0
Soil Reaction (0.1M CaCl2):	--	--
Available Water Capacity (inches):	5	8
Calcium Carbonate Equivalent (percent):	--	--

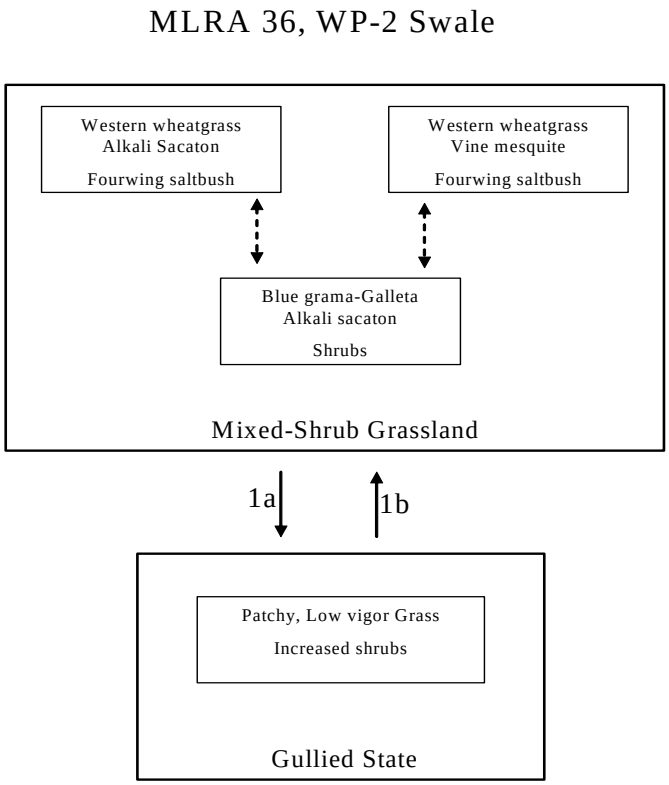
PLANT COMMUNITIES

Ecological Dynamics of the Site

Overview

This site occurs as narrow to broad, slightly concave, gently sloping drainageways that often receive additional run-on water from adjacent uplands. Loamy sites are often associated with swale sites. The Swale site stands out in relation to adjacent sites due to extra water received and resulting increased production. This site has the aspect of a mixed-shrub grassland and is characterized by western wheatgrass, alkali sacaton, blue grama, and galleta. Typical shrubs include fourwing saltbush, rabbitbrush, and winterfat. Forbs are naturally variable in kind and amount and make up what is a relatively broad fluctuation in their percentage of the natural plant community. They are evenly distributed, however, and will at times exhibit a significant aspect influence. This site is resistant to state change unless grass cover is reduced to the point that accelerated erosion takes place. A severe loss of grass cover, soil compaction, and gullying may result from continuous heavy grazing and initiate the transition to the Gullied state.

Plant Community and Transitional Pathways (diagram)



1a. Loss of grass cover, compaction, gullying, soil drying.
1b. Erosion control, prescribed grazing.

MLRA 36; WP-2; Swale

Grassland

•Juniper, Bigelow sagebrush, dunebroom, with few scattered clumps of Indian ricegrass.
•Bare ground interconnected with scattered shrubs and a few grass plants.
•Note extended waterflow patterns and soil surface crusting.
•Tekapo channery silty clay loam, Mckinley Co., NM.

Plant Community Name: Historic Climax Plant Community1

Plant Community Sequence Number: 1 Narrative Label: HCPC

Plant Community Narrative:

State Containing Historic Plant Community

Mixed-Shrub Grassland: The historic plant community is dominated by western wheatgrass. Alkali sacaton is often sub-dominant. On finer textured soils or those sites that receive high run-on water amounts, vine mesquite may be the sub-dominant species. Other important grasses that can appear on this site in significant amounts include blue grama, galleta, and spike muhly. Western wheatgrass and vine mesquite typically decrease in response to heavy grazing pressure, and a blue grama-galleta community with alkali sacaton as the sub-dominant may result. The shrub component typically includes scattered fourwing saltbush with some rabbitbrush and winterfat. Broom snakeweed may be more common on sites that receive above average late fall/early spring moisture, especially following a period of drought.[1]

Diagnosis: Grass and litter cover is high and uniformly distributed, with few large bare areas present. Shrubs are scattered with canopy cover averaging ten percent or less. Evidence of erosion such as pedestalling of grasses, extended water flow patterns, rills and gullies is infrequent.

Ground Cover (Average Percent of Surface Area).	
Grasses & Forbs	30
Bare ground	45
Surface gravel	
Surface cobble and stone	2
Litter (percent)	18
Litter (average depth in cm.)	2
Surface Gravel (% cover)	5

Plant Community Annual Production (by plant type):

	Annual Production (lbs/ac)		
Plant Type	Low	RV	High
Grass/Grasslike	480	780	1080
Forb	60	98	135
Tree/Shrub/Vine	60	98	135
Lichen	--	--	--
Moss	--	--	--
Microbiotic Crusts	--	--	--
Totals	600	975	1350

Plant Community Composition and Group Annual Production:

Plant Type - Grass/Grasslike

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
1	PASM	Western wheatgrass	341-536	341-536
2	SPAI	Alkali sacaton	49-146	49-146
3	BOGR2 MUWR PLJA	Blue grama Spike muhly Galleta	98-146	98-146
4	ELEL5	Bottlebrush squirreltail	29-49	29-49
5	BOCU	Sideoats grama	49-98	49-98
6	SCSC LYPH PAOB BOBA3	Little bluestem Wolftail Vine mesquite Cane bluestem	49-98	49-98
7	MUTO2 ARIST SPCR MOSQ MURI	Ring muhly Threeawn spp. Sand dropseed False buffalograss Mat Muhly	10-49	10-49

Plant Type - Tree/Shrub/Vine

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
8	ATCA2 KRLA2	Fourwing saltbush Winterfat	49-98	49-98
9	LYCIU	Wolfberry	10-49	10-49

	ERNAN5 GUSA2 ARBI3 FAPA	Rubber Rabbitbrush Broom snakeweed Bigelow sagebrush Apache plume		
10	2SHRUB	Other shrubs	10-29	10-29

Plant Type – Forb

11	2FP	Perennials	10-98	10-98
12	2FA	Annuals	10-49	10-49

Plant Type - Lichen

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production

Plant Type - Moss

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production

Plant Type - Microbiotic Crusts

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production

Plant Growth Curves

Growth Curve ID NM 0311
Growth Curve Name: HPCP
Growth Curve Description: WP-2 Swale HCPC arm/cool season perennial plant community

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
0	0	8	15	10	9	20	25	8	5	0	0

Additional States:

Gullied State: The loss of grass cover, decreased available soil moisture, and gullying characterize this site. Patches of low vigor sod-like blue grama are typically present, with galleta occurring as individual plants scattered across the site. Alkali sacaton, if present, is generally found in clumps or tussocks with large interconnected bare areas between plants. On some sites rabbitbrush and broom snakeweed may increase becoming the dominant shrubs.

Diagnosis: Large interconnected bare areas are common. Grass cover is variable ranging from patchy to sparse. Blue grama and galleta are the dominant grass species. Evidence of erosion including rills and gullies is common. Soils may be compacted.

Transition to Gullied State (1a): Transitions to the gullied state may occur in response to a loss of grass cover, soil compaction, soil drying, and erosion. The loss of adequate grass cover can decrease infiltration, organic matter, and soil stability, and cause soil drying, increased runoff rates, and erosion.[2] Heavy use by livestock during periods when the soils are saturated can cause trampling damage and soil compaction. Soil compaction decreases infiltration and increases runoff and erosion.[2] The formation of gullies effectively changes the hydrology and the site dries reinforcing the mechanisms of state change. Transitions to the gullied state appear to be relatively rare. Management differences, soil characteristics, landscape position, and other individual sites characteristics may make them more or less susceptible to this transition.

Key indicators of approach to transition:

- Reduction in western wheatgrass, vine mesquite, and alkali sacaton cover.
- Increase in size and frequency of bare patches.
- Increase in cover of blue grama, galleta.
- The formation of elongated water flow patterns and rills.

Transition back to Mixed Shrub Grassland (1b) The natural hydrology of the site must be restored. Erosion control structures or shaping and filling gullies may be necessary to restore natural run-on flow patterns and allow natural re-vegetation to take place. Prescribed grazing will help restore and maintain adequate grass cover, and permit recovery of function in compacted soils.

ECOLOGICAL SITE INTERPRETATIONS

Animal Community:

This range site provides habitats which support a resident animal community that is characterized by prong horn antelope, kit fox, black-tailed jackrabbit, Botta's pocket gopher, silky pocket mouse, sparrow hawk, mourning dove, chipping sparrow, western spadefoot toad, leopard lizard, and prairie rattlesnake. The black-chinned sparrow nests in this rangesite, the chestnut-collared longspur winters and the common raven and prairie falcon hunt over this site.

Hydrology Functions:

The runoff curve numbers are determined by field investigations using hydrologic cover conditions and hydrologic soil sgroups.

Hydrologic Interpretations	
Soil Series	Hydrologic Group
Moriarty	D

Recreational Uses:

This site has potential for hiking, horseback riding, nature observation, photography, picnicking, and camping, although the latter two activities may be limited due to the lack of shade normally found on the site. Occasionally, during the spring and summer when soil moisture conditions are adequate, a colorful array of wild flowers may be seen.

Wood Products:

This site has little or no significant value for wood products.

Other Products:

This site is suitable for grazing during all seasons of the year, generally without regard to kind or class of livestock, but is not well suited for continuous year-long grazing if the natural potential vegetation is to be maintained. Under such use, cool-season grasses, such as western wheatgrass and bottlebrush squirreltail, tend to decline or disappear. If use is heavy and prolonged, some of the more palatable warm-season species will also decline. The site, in a typically deteriorated condition, may be characterized by threeawns, ring muhly, and low vigor, sod-like blue grama mixed with heavy stands of rabbitbrush and broom snakeweed. Excessive amounts of bare ground also occur, and the site is highly subject to gullying at this stage. It may also be slow to recover using improved grazing management alone.

Other Information:	
Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month	
Similarity Index	Ac/AUM
100 - 76	2.9-3.8
75 – 51	3.7-5.0
50 – 26	4.7-10.0
25 – 0	10.0+

Plant Preference by Animal Kind:

	Code	Species Preference	Code
Stems	S	None Selected	N/S
Leaves	L	Preferred	P
Flowers	F	Desirable	D
Fruit/Seeds	F/S	Undesirable	U
Entire Plant	EP	Not Consumed	NC
Underground Parts	UP	Emergency	E
		Toxic	T

Animal Kind: Livestock

Animal Type: Cattle

Common Name	Scientific Name	Plant Part	Forage Preferences											
			J	F	M	A	M	J	J	A	S	O	N	D
Alkali sacaton	Sporobolus airoides	EP	D	D	D	D	D	P	P	P	D	D	D	D
Western wheatgrass	Pascopyrum smithii	EP	D	D	P	P	P	D	D	D	D	D	D	D
Blue grama	Bouteloua gracilis	EP	D	D	D	D	P	P	P	P	P	D	D	D
Bottlebrush squirreltail	Elymus elymoides	EP	U	U	D	D	D	U	U	U	D	D	D	U
Sideoats grama	Bouteloua curtipendula	EP	D	D	D	D	D	D	D	D	D	D	D	D
Spike muhly	Muhlenbergia wrightii	EP	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Little bluestem	Schizachyrium scoparium	EP	D	D	D	P	P	P	P	D	D	D	D	D
Cane bluestem	Bothriochloa brabinodis	EP	U	U	U	U	U	U	P	P	D	U	U	U
Winterfat	Krascheninnikovia lanata	EP	D	D	P	P	P	P	P	P	D	D	D	D

Fourwing saltbush	Atriplex canescens	EP	P	P	P	P	P	D	D	D	D	D	D	P
Perennial forbs	various	EP	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S

Supporting Information

Associated Sites:

Site Name	Site ID	Site Narrative

Similiar Sites:

Site Name	Site ID	Site Narrative

State Correlation:
This site has been correlated with the following states:

Inventory Data References:

Data Source	Number of Records	Sample Period	State	County

Type Locality:

Relationship to Other Established Classifications:

References

1. McDaniel, K. C., L. A. Torell, and J.W. Bain. 1993. Overstory-understory relationships for broom snakeweed-blue grama grasslands. Journal of Range Management. 46: 506-511.

2. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheets. Rangeland Soil Quality— [Online]. Available: http://soils.usda.gov/sqi/soil_quality/land_management/range.html

Data collection for this site was done in conjunction with the progressive soil surveys within the New Mexico and Arizona Plateaus & Mesas Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: McKinley, Catron, Cibola, Socorro and Sandoval.

Characteristic Soils Are:	

Other Soils included are:	

Site Description Approval:

Author	Date	Approval	Date
Don Sylvester	02/15/80	Don Sylvester	02/15/80

Site Description Revision:

Author	Date	Approval	Date
Brenda Simpson	07/23/02	George Chavez	6/10/05
David Trujillo	6/10/05		